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A New Species of "Cypris Y" (Crustacea : Maxillopoda) from the North Pacific

By

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With Text-figures 1–3

Abstract A new form of cypris y is described from the North Pacific off southern Honshu, Japan, under the name *Hansenocaris tentaculata*, sp. nov. The bifurcate paraocular process of this cypris y is unique in having very long branches, with anterior one being markedly sinuate. The postocular filamentary tufts are wanting. There are two closely set papillae behind each compound eye. The abdomen is composed of only two somites. The limits of the genus *Hansenocaris* as well as the taxonomic validity of the Facetotecta are discussed.

While investigating plankton samples collected in Tanabe Bay on the Pacific coast of southern Honshu, Japan, I found a curious "cypris y" (postnaupliar stage of the crustacean superorder Facetotecta Grygier, 1985) which bore prominent tentacular processes beneath its head. Closer examination revealed unexpectedly that the tentacular processes were actually anterior and posterior branches of the bifurcate paraocular processes which were first described by Itô (1985) for three species of *Hansenocaris* cyprids from the North Pacific. Unlike their counterparts in the three species of *Hansenocaris*, the bifurcate paraocular processes of this cypris y were unique not only in their extreme size but also in their shape. This cypris y was also clearly different from the other *Hansenocaris* cyprids, including unnamed Atlantic forms (see Bresciani, 1965, Schram, 1970), in the number of abdominal somites. Judging from these major differences, there is little doubt that the genus *Hansenocaris* can not accommodate this cypris y; nevertheless, I still hesitate to propose a new genus for it and would like to describe it as a new species of *Hansenocaris* in this paper. The reasons for not proposing a separate genus will be dealt with later.

The plankton sample which yielded the present specimen was collected in Tanabe Bay (33°41′N, 135°21′E) by a vertical haul with a small conical net (94 μm mesh) from a depth of 5 m (a few meters above the bottom) to the surface. Water temperature was 19°C.

The specimen was fixed with 5% formalin and dissected in glycerin. Isolated legs were mounted on slide glasses with gum-chloral medium, while the cephalon and abdomen were mounted in glycerin. These slides containing the parts of the holotype are deposited in the Seto Marine Biological Laboratory, Kyoto University.

Before going further I would like to express my sincere thanks to Drs Mark J. Grygier and J.-S. Ho for their critical readings of the manuscript.

Hansenocaris tentaculata sp. nov.

Material. Holotype: cypris y larva (23-V-1986. Itô *leg.*). Type locality: Tanabe Bay, Japan.

Description of the holotype: Body (Figs 1-A, 2-A, B) 0.35 mm long, consisting of cephalothorax (with leg 1), five free thoracic somites, and two abdominal somites. Cephalothorax dorso-ventrally flattened, tinctured with reddish orange due to presence of scattered and concentrated pigment granules under carapace (see Fig. 1-C); a number of pigment granules concentrated near anterior tip, forming a red-orange spot (see Fig. 1-A). Carapace extending over second free thoracic somite laterally, without mesh-like texture and almost smooth, but sculptured with a few very faint, longitudinal lines; ventral rim scarcely inflected (see Fig. 2-E). Nauplius eye positioned anterior to middle of paired compound eyes. Compound eyes well-developed, reddish brown. Bifurcate paraocular process (Fig. 2-D, E) arising from inner ventral portion of each compound eye; basal stalk 10 μm long; anterior branch subcylindrical, about 5 μm in diameter, 110 μm long, horizontally sinuate with two acute flexures, its apex pointing inward; posterior branch measuring about 16 μm across its widest portion, 150 μm long, loosely extending toward posterior, containing a fibrous structure (? nerves; see Fig. 1-B) which extends through almost the whole length. Postocular filamentary tufts wanting, but with two closely set papillae (Fig. 2-E) arising from places where postocular filamentary tufts would have been located (see Fig. 1-B). Oral pyramid (Fig. 2-D, E) well-developed, armed apically with a single claw and posteriorly with two pairs of closely set spines. Fused first thoracic somite (with leg 1) demarcated from cephalon by a ventral suture. Tergites of first three free thoracic somites lacking pleural extentions. Fourth and fifth free thoracic somites each furnished with a well-developed pleurotergite (Fig. 2-C). First abdominal somite (Figs 1-C, 3-A, B) very short, furnished with a tergite which scarcely develops pleural parts. Second (last) abdominal somite as long as last three thoracic somites combined, somewhat depressed dorso-ventrally, containing a number of red-orange pigment granules, dorsally sculptured with chitinous ridges which forms polygonal plates as shown in figures; ventral face almost flat, without clear ridges but with very faint ridges marginally. Furcal rami about 10 μm long, almost as long as wide; each consisting of one segment with three serrated terminal setae.

First antenna (Fig. 2-D, E) consisting of four segments; first segment represented by a soft basal part which is indistinctly demarcated from the second segment; second segment as long as apical two segments combined, with no ornamentation; third segment armed with a well-developed aesthetasc on its outer side and a curved spine (? spiniform extention) at its tip; fourth segment small, armed apically with two setae.

Leg 1 (Fig. 3-C). Intercoxal plate deeply inserted into inner half of coxal base. Coxa and basis clearly demarcated from each other, with no spine or seta. Coxa bearing an internal structure (?tendon) which looks as if it were a fine spinule. Exopodite consisting of two segments; first segment very short, with no seta or spine; second segment three times as long as first one, armed with one subapical outer

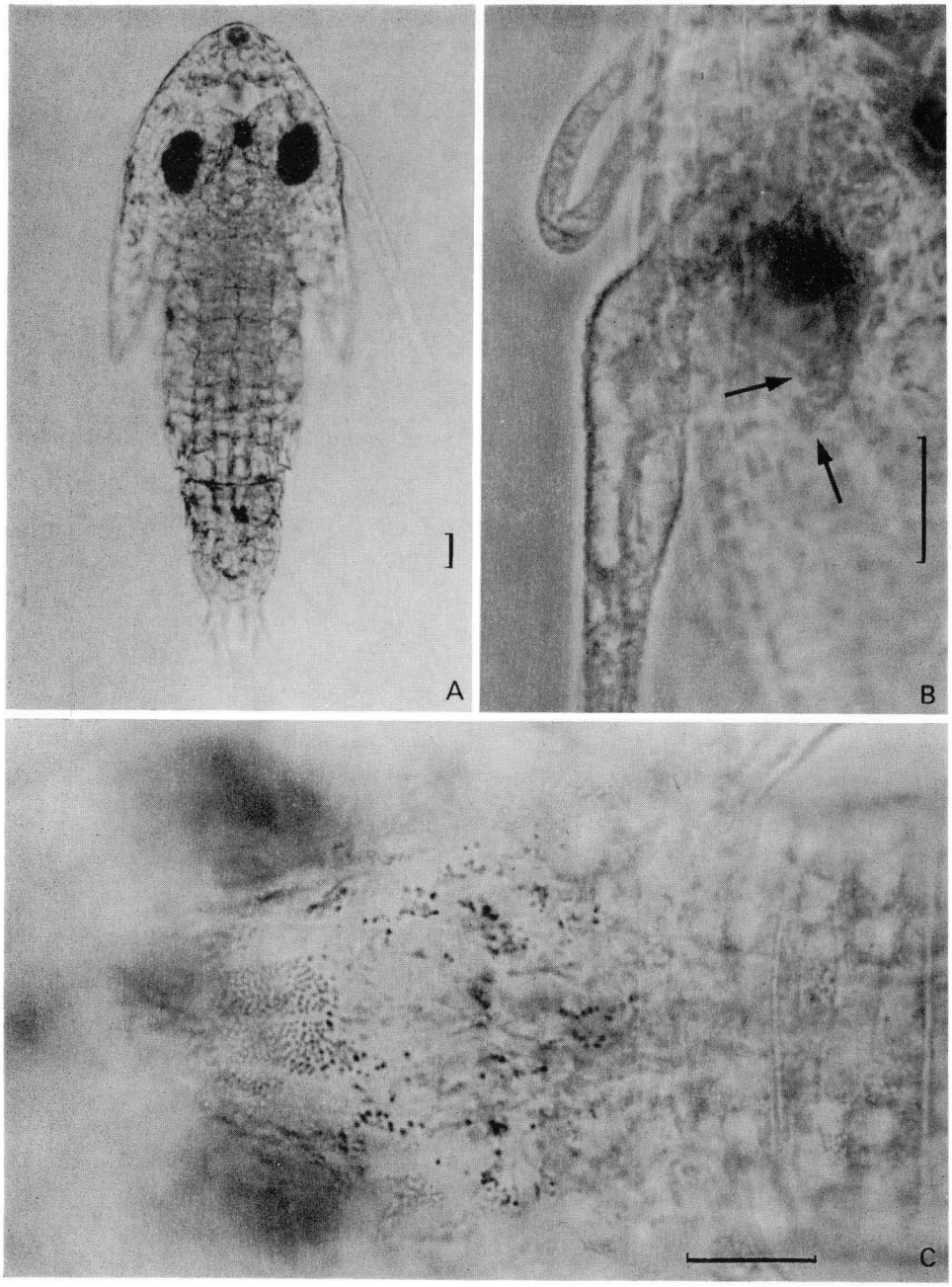

Fig. 1. *Hansenocaris tentaculata* sp. nov. Holotype. A. Habitus, dorsal; B. Bifurcate paraocular process, ventral (phase-contrast): Arrows indicate two closely set papillae behind it; C. Dorsal view of carapace with pigment granules. Scale bar: 20 μm.

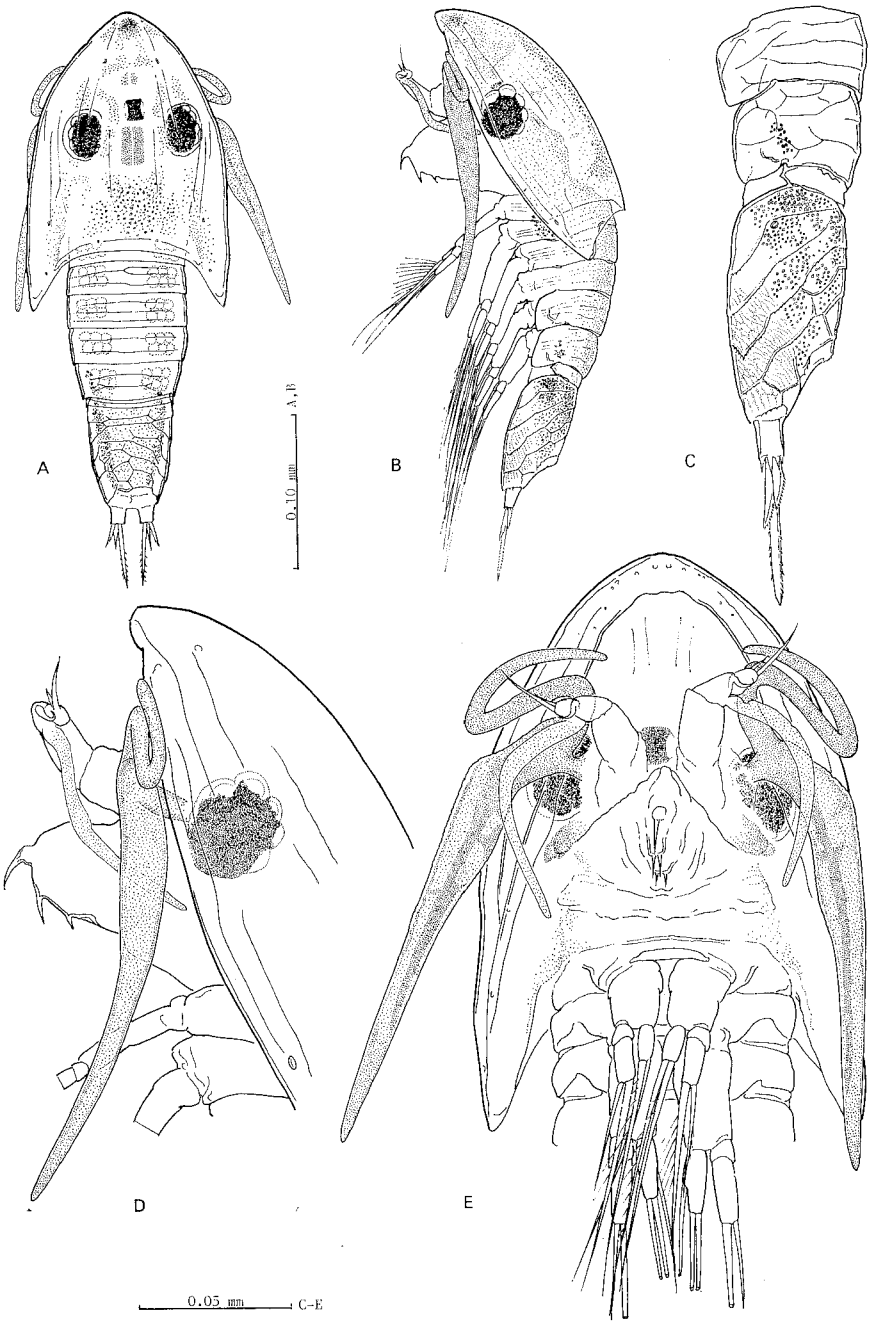

Fig. 2. *Hansenocaris tentaculata* sp. nov. Holotype. A. Habitus, dorsal; B. Habitus, lateral; C. Last two thoracic somites and abdomen, lateral (leg 5 and leg 6 omitted); D. Cephalothorax, lateral; E. Cephalothorax, ventral.

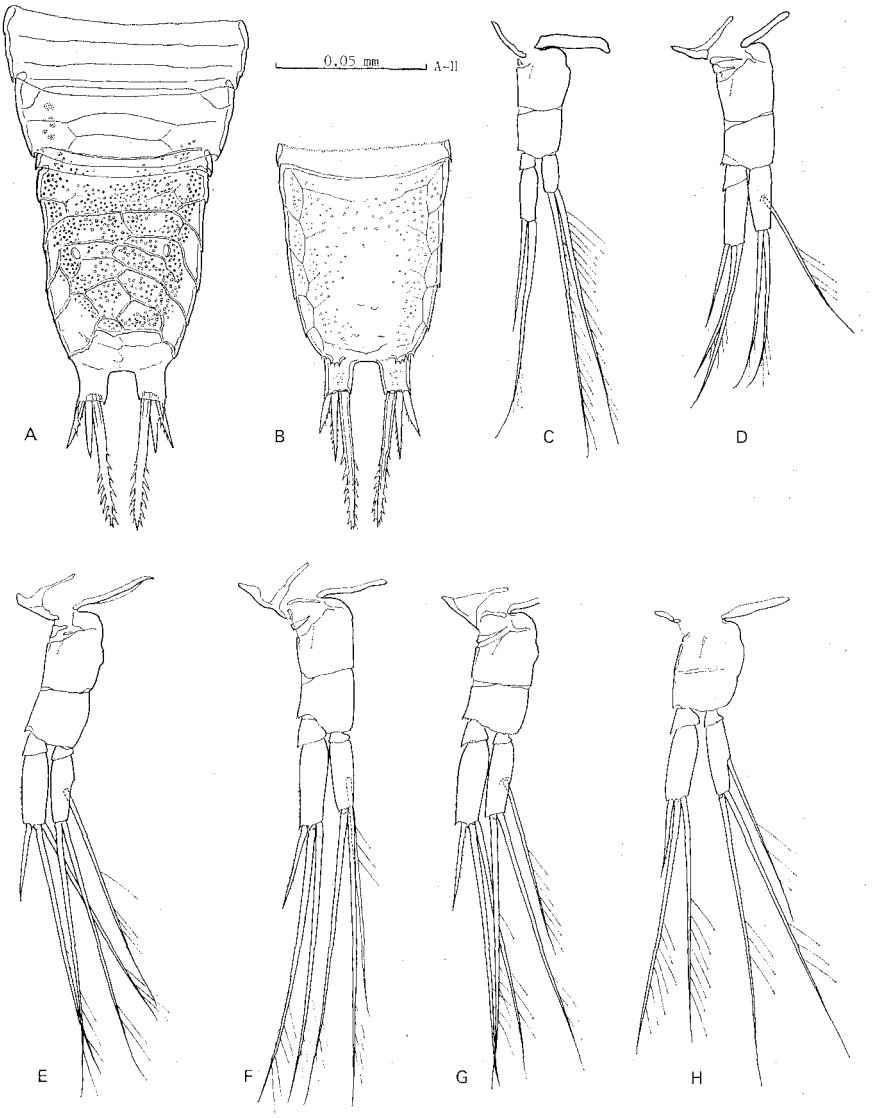

Fig. 3. *Hansenocaris tentaculata* sp. nov. Holotype. A. Last two thoracic somites and abdomen, dorsal; B. Abdomen, ventral; C. Leg 1; D. Leg 2; E. Leg 3; F. Leg 4; G. Leg 5; H. Leg 6.

spine and one apical seta, which is long and thick. Endopodite consisting of one segment, which reaches the middle of the second exopodite segment, armed apically with two hairy setae, which are about 6 times as long as this segment. Leg 2 (Fig. 3-D). Intercoxal plate markedly lower than its counterpart in leg 1. Coxa, basis, and segments of both rami larger than their counterparts in leg 1. Segmentation of both rami as in leg 1. Second exopodite segment armed with one subapical outer spine and two slender apical setae. Endopodite segment extending beyond mid-point of second exopodite segment, armed with two apical setae, which are 2.5 times

as long as this segment, and one slender seta, which arises from the middle of its posterior face. L e g 3 (Fig. 3-E), l e g 4 (Fig. 3-F), l e g 5 (Fig. 3-G). Coxa, basis, and exopodite similar to their counterparts in leg 2. Endopodite consisting of two segments; first segment very short, with no spines or setae; second segment similar to its counterpart in leg 2 in shape and armature, though setae are longer. L e g 6 (Fig. 3-H). Coxa and basis shorter and wider than their counterparts in the preceding three legs; demarcation between them very faint. Both rami segmented and armed as in the preceding three legs.

Remarks. The present specimen has two closely set papillae behind each compound eye. They are considered remnants of naupliar second antenna and mandible. This new insight is based on my work in progress, in which a cypris y larva of another species, which was raised from a nauplius y larva in the laboratory, bears not only typical postocular filamentary tufts but also similar papillae, which are actually remnants of the naupliar second antenna and mandible. This finding will be explained in detail in a separate paper, I deem it to be significant for identifying certain problematic structures of cypris y.

The present new species differs from all of the known species of cypris y of the genus *Hansenocaris* (*H. pacifica* Itô, 1985, *H. rostrata* Itô, 1985, and *H. acutifrons* Itô, 1985) in some major characteristics. Among them, the bifurcate paraocular process is most striking. The bifurcate paraocular process of the new species is very large, and its long branches are entirely exposed outside the carapace as if they were tentacles (from this appearance the species name, *tentaculata,* was formulated). In contrast, the counterparts in the other species are small and usually hidden inside their carapace (Itô, 1985; see also Itô & Ohtsuka, 1984, Itô, 1984). The abdomen is also unique in being composed of two somites, while there are four somites in the other species. Furthermore, the new species also differs from the other species in its leg segmentation; each endopodite of first two pairs of legs consists of one segment in the new species but of two segments in the other species. In addition to these major discrepansies, a number of minor differences were also detected between them, to mention a few, the shape of the carapace, the surface structure and armature of the abdomen, and the shape of the furcal rami.

Based upon these numerous differences, there is little doubt that the present new species should occupy its own taxonomic position separate from the other *Hansenocaris* species. This proposition would stand even if taking into consideration Bresciani's and Schram's cypris y specimens, which have not been formally proposed as the species of *Hansenocaris* (see Bresciani, 1956, Schram, 1970). However, I still hesitate to propose a separate genus for *H. tentaculata.* In fact, I am now rather skeptical about the validity of Facetotecta, which accommodates *Hansenocaris.*

When the Facetotecta was established for cypris y by Grygier (1985) as a taxon distinct from the Ascothoracida, the presence of the bifurcate paraocular processes as well as the postocular filamentary tufts in these crustaceans was unknown. As indicated by Itô (1985, 1986a) and later concluded by the same author (Itô, 1986b),

the bifurcate paraocular process of cypris y is a homologue of the so-called "second antenna" or "antenna-vestigial eyestalk complex" found in some ascothoracids (see Grygier, 1984). The "second antenna" of ascothoracids is a markedly developed structure with very long branches. On the contrary, the bifurcate paraocular processes in the three species of *Hansenocaris* are moderately developed and clearly distinguishable from the "second antenna" of ascothoracids. However, the bifurcate paraocular process of the present new species is huge, and its appearance closely approaches that of the "second antenna" of ascothoracids. Due to this fact, I am now inclined to accept Bresciani's view that cypris y and nauplius y are larval stages of ascothoracids (Bresciani, 1965). In addition, my recent observations (unpublished) on the development of many nauplius y larvae have brought forth some unexpected results in which distinctly different nauplius y larvae could develop into very similar cypris y stages. Our current knowledge on the morphology of cypris y's implies that generic discrimination within Facetotecta is still unclear and, furthermore, the taxon Facetotecta might not be a different entity as proposed by Grygier (1985). Due to these circumstances, I refrained from proposing a separate genus to accommodate the new form and so tentatively place it in the genus *Hansenocaris*.

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